

Public Meeting  
February 8, 2010

**Lower Nansemond River:  
Bennett Creek, Knotts Creek  
& Bleakhorn Creek  
*Shellfish*  
Total Maximum Daily Load**



***Public comment information***

- Comment period ends on...
  - **March 10, 2010**
- Send comments to:
  - Jennifer Howell, VA DEQ
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  - Virginia Beach, VA 23462
  - Phone: (757) 518-2111
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  - Email:  
[jennifer.howell@deq.virginia.gov](mailto:jennifer.howell@deq.virginia.gov)



## *Meeting agenda*

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- TMDL Process Overview
- Watershed Delineation & MS4 coverage area
- Bacteria Source Assessment and TMDL Development
- Questions

## *Water quality monitoring*

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Physical and chemical parameters are collected in streams and lakes all across the state

- pH
- Temperature
- Dissolved oxygen
- Bacteria\*
- Nutrients
- Metals
- Toxic pollutants
- Biological communities
- Fish tissue



## *Data assessment*

- Data is compared to Water Quality Standards
  - - numeric or narrative limits on pollutants that ensure the protection of human health and of aquatic life
  - - criteria used to support Designated Uses
- Water Quality Assessment Report
  - - summary of data comparison
  - - produces an Impaired Waters list
- Impaired Waters require a TMDL

## *What is a TMDL*



- **TMDL = Total Maximum Daily Load**  
maximum amount of a pollutant that can enter a waterbody without violating water quality standards (WQS)

## *When are TMDLs needed?*

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- State and federal laws require TMDLs to be developed for **Impaired Waters (305b/303d Integrated Report)**
- Impaired waters do not meet applicable **Water Quality Standards (WQS)**
- Waters that do not meet WQS do not support their **Designated Use(s)**

## *Designated uses*

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- **All** Virginia waters are designated for:
  - primary contact recreation (swimming)
  - shellfish growing and consumption ★
  - aquatic life
  - fishing and fish consumption
  - drinking water



## *Virginia's TMDL development process*

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- Public notice for TMDL development
- TMDL study
- Public notice for comments
- Final TMDL report
- EPA approval
- Implementation Planning Process
- Implementation



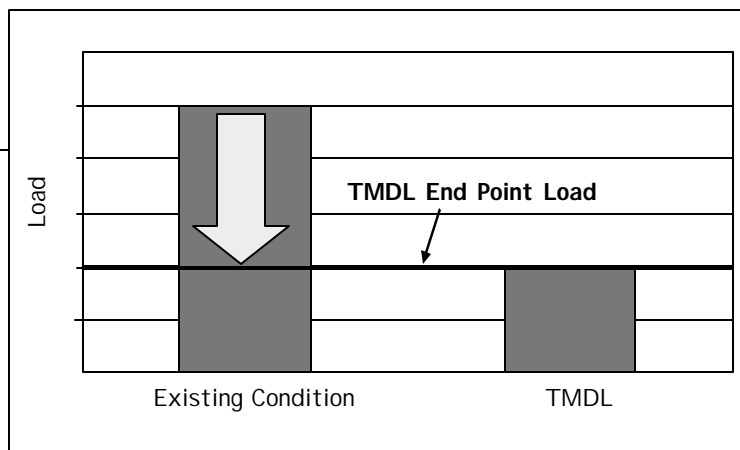
## *Stakeholder involvement in the TMDL process*

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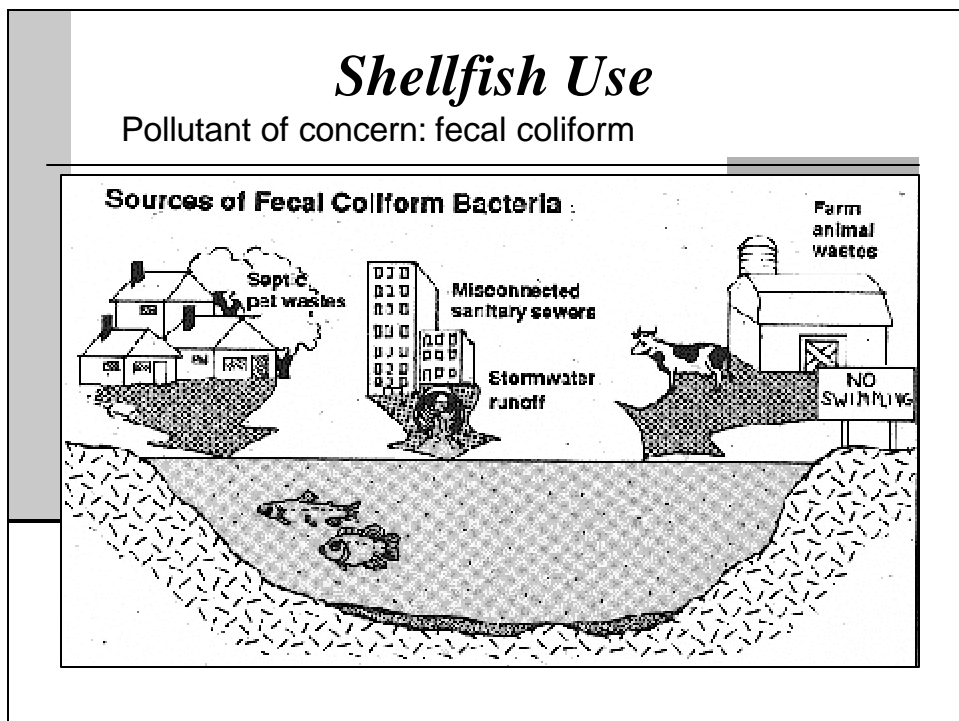
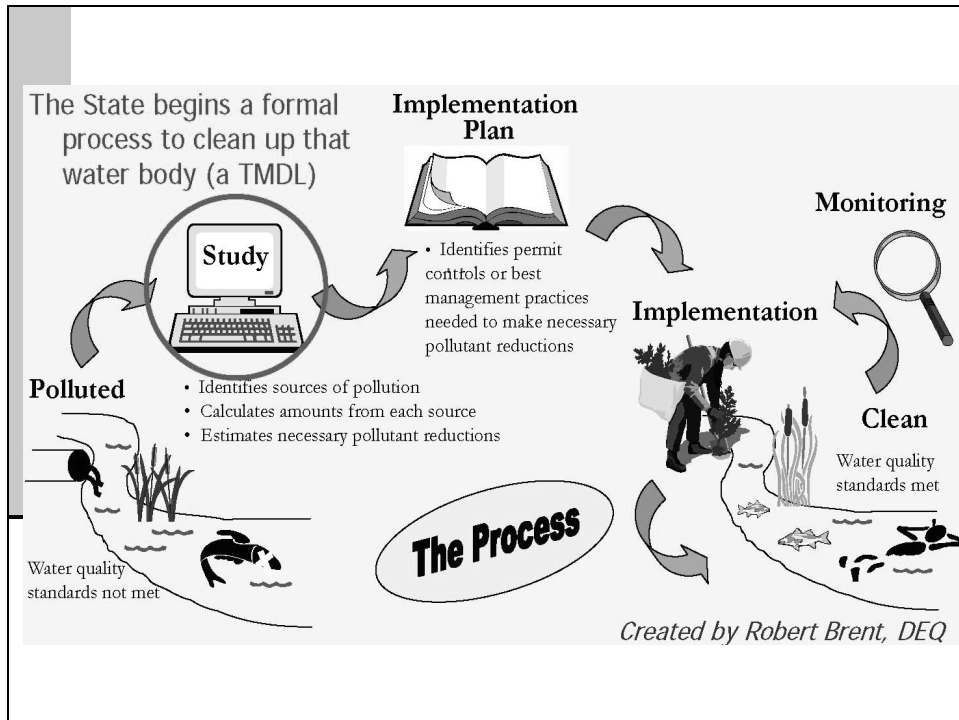
- Comment on the proposed TMDL study
- Participate in the development of bacteria TMDLs and staged reduction targets
- Participate in the development of TMDL implementation plans
- Provide and confirm information

## *How is a TMDL developed?*

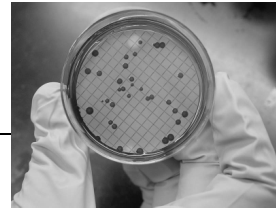
- Identify all sources of a given pollutant within the watershed
- Calculate the amount of pollutant entering the stream from each source



- Calculate the pollutant reductions needed, by source, to attain water quality standards
- Allocate the allowable load to each source and include a margin of safety



# WHY?



- Found in **digestive tract of warm blooded animals** such as humans, pets, livestock and wildlife
- Presence in water samples is a strong indicator of recent **sewage or animal waste contamination**
- Strong correlation between bacteria concentrations and **gastrointestinal illnesses**

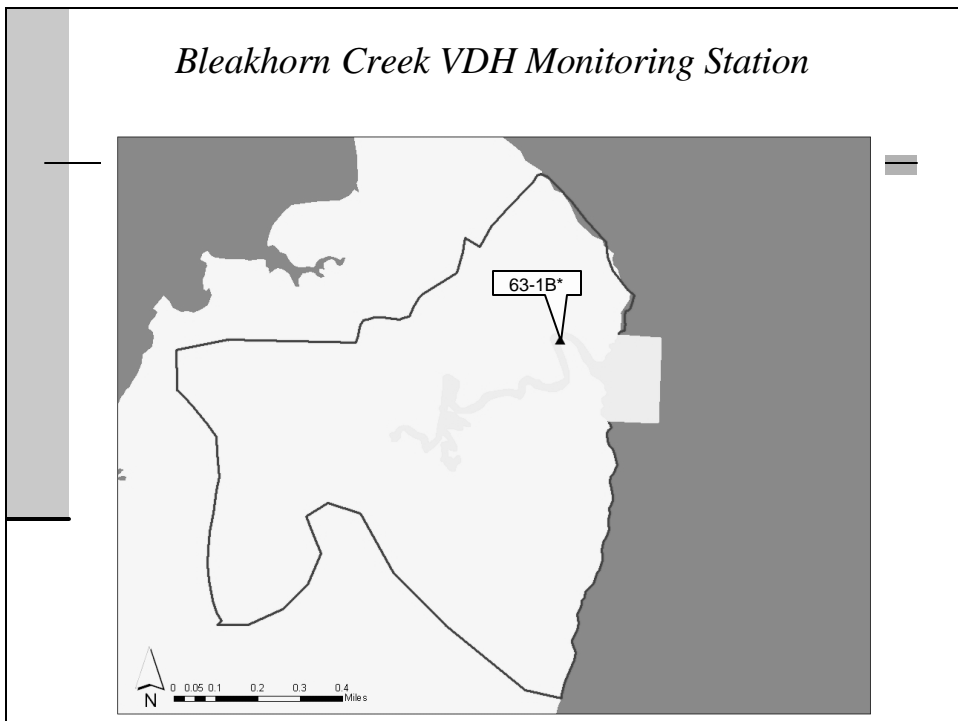
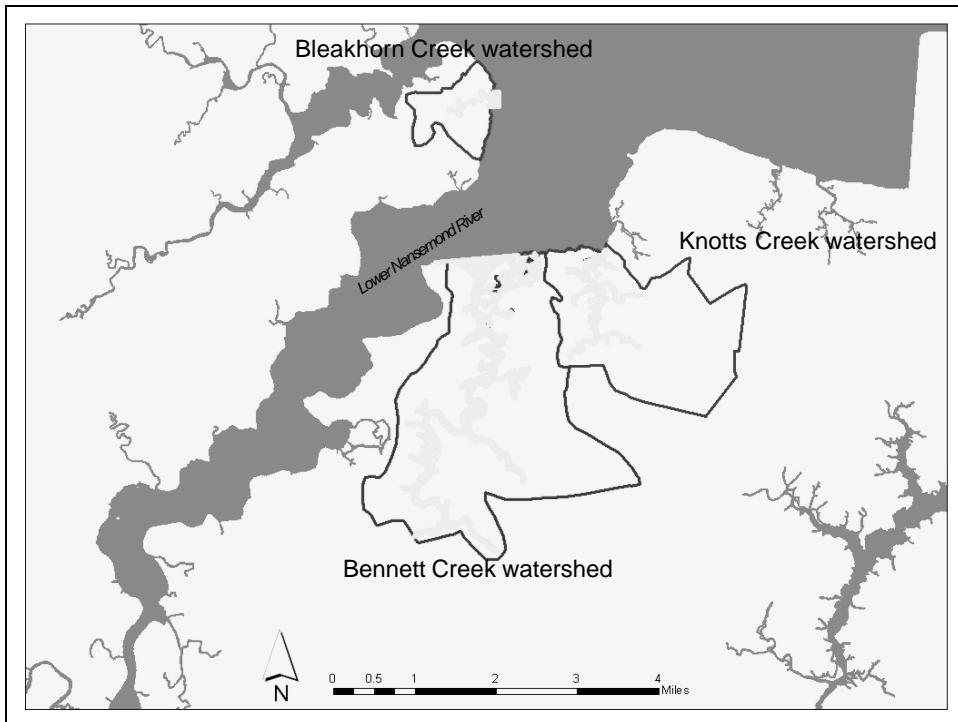


## Water Quality Standards

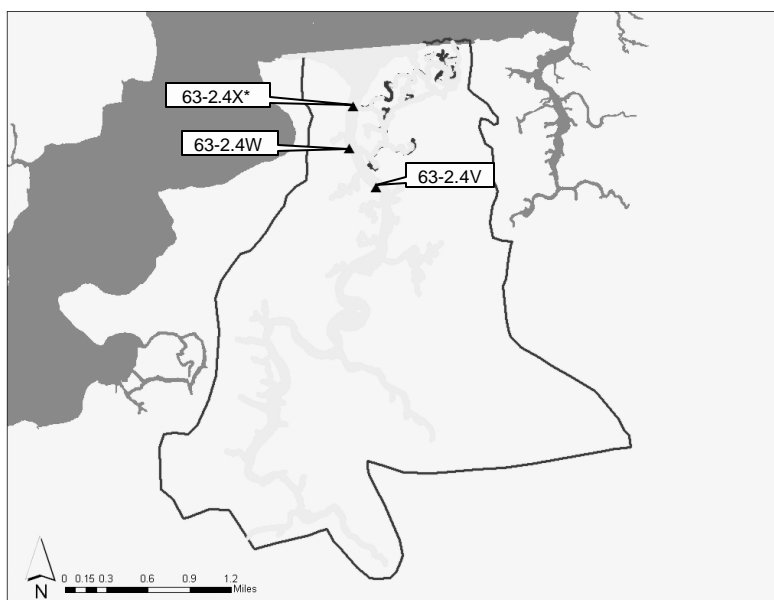


### Shellfish Use Standard:

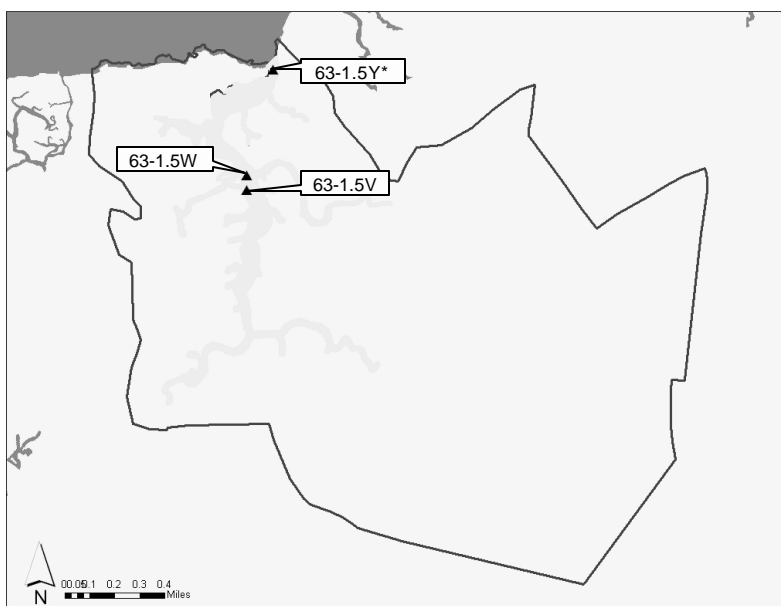
- Fecal coliform
  - 14 cfu/100ml (geometric mean: applies to 2 or more samples obtained in 1 calendar month)
  - 49 cfu/100mL (90<sup>th</sup> percentile)



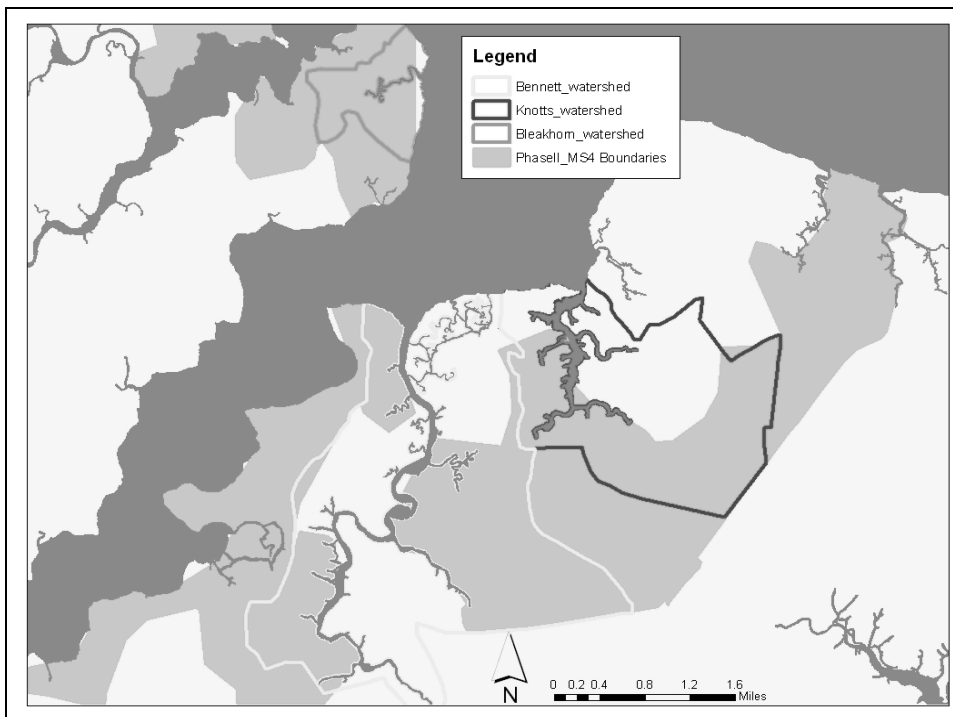
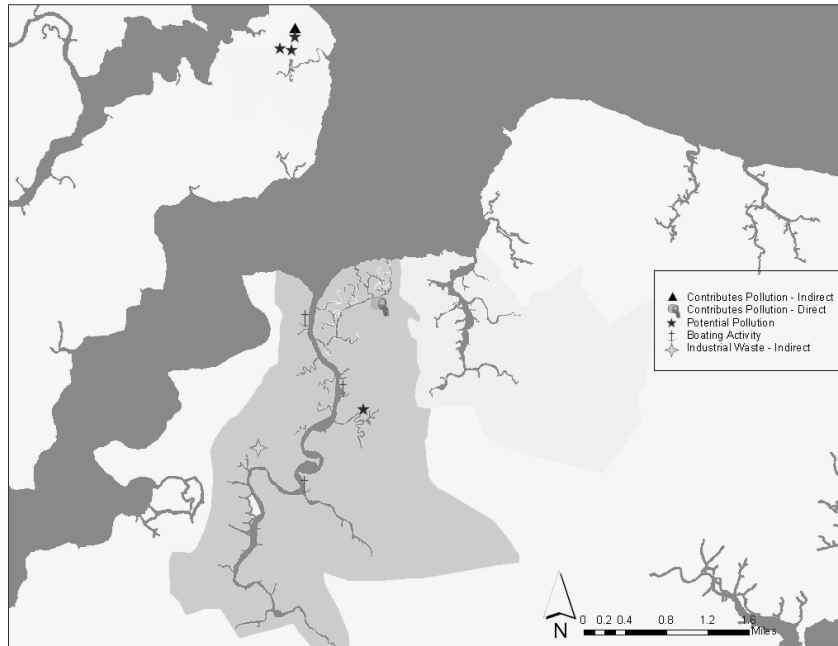
### *Bennett Creek VDH Monitoring Stations*



### *Knotts Creek VDH Monitoring Stations*



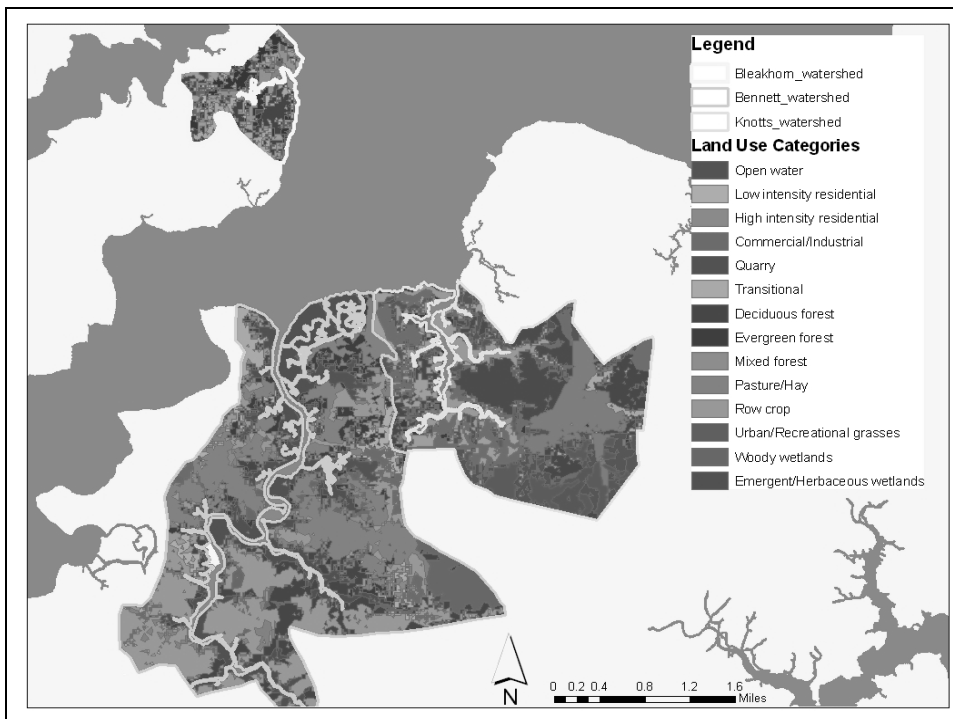
## VDH-DSS Shoreline Sanitary Survey 2010



## *Estimated Fecal Coliform Source Populations*

Fecal Coliform Source		Estimated Populations		
		Bennett Cr	Knotts Cr	Bleakhorn Cr
Livestock	Cattle	53	11	4
	Chicken	5185	1367	229
	Pig	127	34	42
	Horse	11	2	0
Wildlife	Deer	85	31	8
	Raccoon	302	152	29
	Geese	184	64	6
	Duck	398	138	14
Pet	Dog	213	112	21
<b>Human</b>	Septic/Failing Septic*	353/42	192/23	18/2

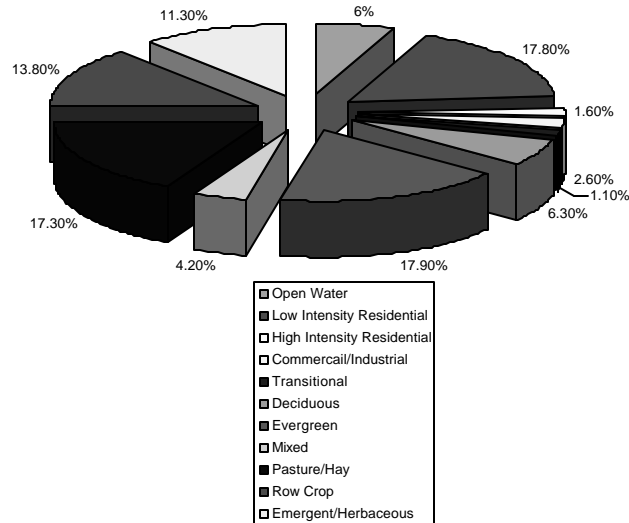
\* Failing septic systems are based on the number of houses in the watershed, year houses were built, and the number of deficiencies identified in the VDH-DSS Shoreline Sanitary Survey





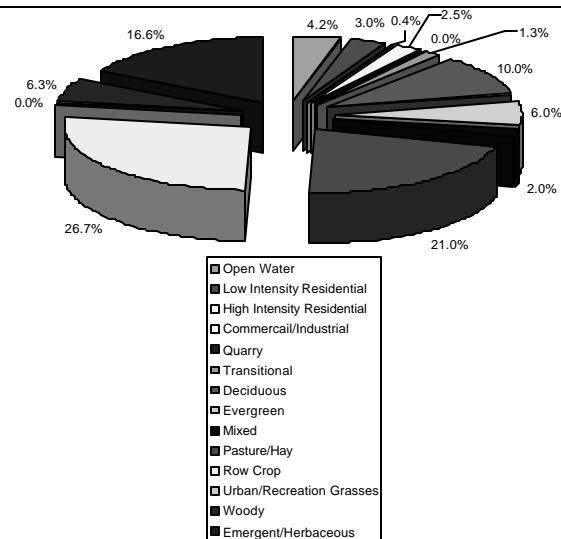
# Land Use Distribution

## Bleakhorn Creek



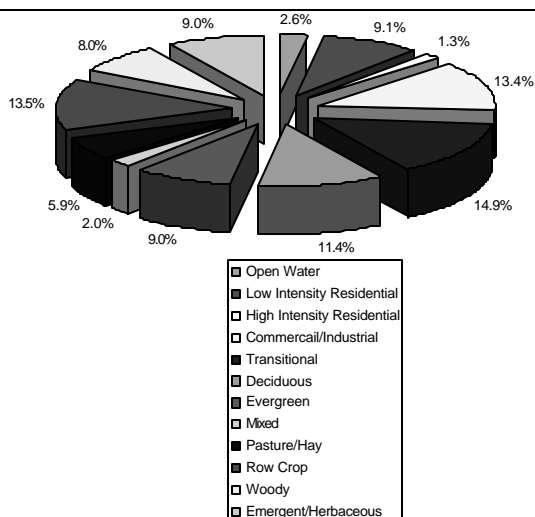
# Land Use Distribution

## Bennett Creek

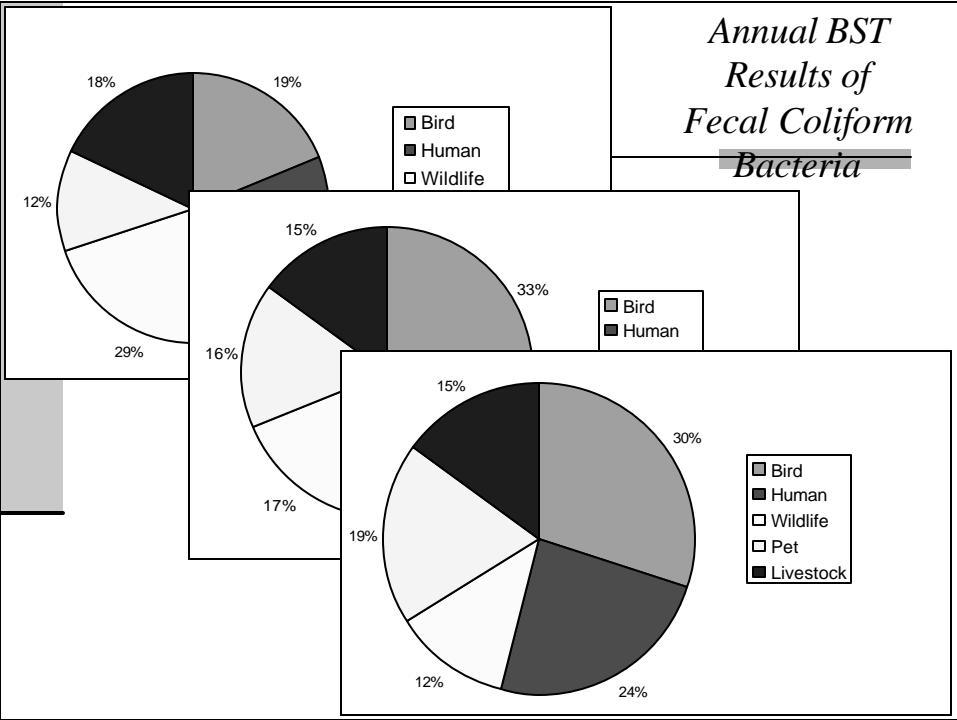


# Land Use Distribution

## Knotts Creek



	Bleakhorn	Bennett	Knotts
<b>Open Water</b>	28.02549686040	167.20669527727	56.18488482934
<b>Urban</b>			
Low Intensity Residential	83.32849427255	118.48036582901	197.00802489883
High Intensity Residential	7.44075740207	17.63866553663	27.48843565269
Commercial/Industrial	12.05410191115	99.60767050289	288.50366292725
<b>Barren or Mining</b>			
Bare Rock/ Sand/ Clay	0		
Quarry	0	0.51499923616	
<b>Transitional</b>	5.11620219366	51.82029394874	320.61202280548
<b>Forest</b>			
Deciduous	29.33096377635	401.33090687802	244.97950046483
Evergreen	83.68601012295	239.57881714784	193.10666794014
Mixed	19.80174594290	81.15731946599	43.46988202815
Agriculture			
<b>Pasture/Hay</b>	80.96171953159	840.87459622980	128.25526441512
<b>Row Crop</b>	64.67158999615	1066.04125478774	290.75466096772
Small Grains	0		
Other	0		
Urban/Recreation Grasses	0	0.14241740089	
<b>Wetlands</b>			
Woody	0	252.92605532751	172.84629494235
Emergent/Herbaceous	52.72445723927	662.51950488198	194.29319792727
<b>Total Acres</b>	467.14153924906	3999.83956245047	2157.50249979917



*Current Loads and Estimated Load Reductions  
Based upon the **Geometric Mean Standard***

BleakhornCreek

Source	BST Allocation (% of Total Load)	Current Load (MPN/day)	Allowable Load (MPN/day)	Required Reduction (%)
Livestock	15			
Wildlife	12			
Human	24			
Pets	19			
Bird	30			
Point Source	-			
<b>Total</b>	<b>100.0</b>			

*Current Loads and Estimated Load Reductions  
Based upon the Geometric Mean Standard*

Bennett Creek

Source	BST Allocation (% of Total Load)	Current Load (MPN/day)	Allowable Load (MPN/day)	Required Reduction (%)
Livestock	18			
Wildlife	29			
Human	22			
Pets	12			
Bird	19			
Point Source	-			
<b>Total</b>	<b>100.0</b>			

*Current Loads and Estimated Load Reductions  
Based upon the Geometric Mean Standard*

Knotts Creek

Source	BST Allocation (% of Total Load)	Current Load (MPN/day)	Allowable Load (MPN/day)	Required Reduction (%)
Livestock	15			
Wildlife	17			
Human	19			
Pets	16			
Bird	33			
Point Source	-			
<b>Total</b>	<b>100.0</b>			

*Current Loads and Estimated Load Reductions  
Based upon the 90<sup>th</sup> Percentile Standard\**

BleakhornCreek

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Livestock	15			
Wildlife	17			
Human	19			
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Bird	33			
Point Source	-			
<b>Total</b>	<b>100.0</b>			

*TMDL Summary Based on the Geometric  
Mean Standard*

Condemnation Area	WLA (Point Sources)	LA (Non-point Sources)	MOS (Margin of Safety)	TMDL
Bleakhorn Creek 63-046C (VAT-G13E-10)			<i>Implicit</i>	
Bennett Creek 63-046A (VAT-G13E-12)			<i>Implicit</i>	
Knotts Creek 63-046B (VAT-G13E-11)			<i>Implicit</i>	

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## *Contact Information*

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**TMDL information:** [www.deq.virginia.gov/tmdl](http://www.deq.virginia.gov/tmdl)

**WQ Assessment:** [www.deq.virginia.gov/wqa](http://www.deq.virginia.gov/wqa)